

(!!!)Квадрат суммы и разности (разложить на множители методом группировки)

Разложить на множители методом **разбиения отдельных слагаемых в сумму или разность нескольких слагаемых** и последующей группировки

$$1) 9m^2 + 6mn + n^2 = 9m^2 + 3mn + 3mn + n^2 = m(9m + 3n) + n(3m + n) = 3m(3m + n) + n(3m + n) = (3m + n)(3m + n) = (3m + n)^2$$

подсказка $6mn = 3mn + 3mn$

$$2) 16p^2 - 56pq + 49q^2 = 16p^2 - 28pq - 28pq + 49q^2 = p(16p - 28q) + q(-28p + 49q) = 4p(4p - 7q) - 7q(4p - 7q) = (4p - 7q)(4p - 7q) = (4p - 7q)^2$$

подсказка $-56pq = -28pq - 28pq$

$$3) 3a^2 + 2b^2 - 5ab = 3a^2 + 2b^2 - 3ab - 2ab = 3a^2 - 3ab + 2b^2 - 2ab = a(3a - 3b) + b(2b - 2a) = 3a(a - b) + 2b(b - a) = 3a(a - b) - 2b(-b + a) = (a - b)(3a - 2b)$$

подсказка $-5ab = -3ab - 2ab$

$$4) 10a^2 + 9ab - 9b^2 = 10a^2 + 15ab - 6ab - 9b^2 = a(10a + 15b) + b(-6a - 9b) = 5a(2a + 3b) + 3b(-2a - 3b) = 5a(2a + 3b) - 3b(2a + 3b) = (2a + 3b)(5a - 3b)$$

подсказка $9ab = 15ab - 6ab$

$$9ab = 6ab + 3ab$$
$$9ab = 10ab - 1ab$$

$$5) 35a^2 + 2ab - b^2 = 35a^2 + 7ab - 5ab - b^2 = a(35a + 7b) + b(-5a - b) = 7a(5a + b) + b(-5a - b) = 7a(5a + b) - b(5a + b) = (5a + b)(7a - b)$$

подсказка $2ab = 7ab - 5ab$

$$6) x^2 + 5x - 6 = x^2 + 6x - 1x - 6 = x^2 - 1x + 6x - 6 = x(x - 1) + 6(x - 1) = (x - 1)(x - 6)$$

подсказка $5x = 6x - 1x$

подсказка $5x = 3x + 2x$

$$7) 2x^2 - 5x + 3 = 2x^2 - 2x - 3x + 3 = x(2x - 2) + 3(-x + 1) = 2x(x - 1) + 3(-x + 1) = 2x(x - 1) - 3(x - 1) = (x - 1)(2x - 3)$$

подсказка $-5x = -2x - 3x$

$$6x^2 + xy - 21xz - 15y^2 - 35yz = 6x^2 + 10xy - 9xy - 21xz - 15y^2 - 35yz = x(6x + 10y) + x(-9y - 21z) + y(-15y - 35z) = 2x(3x + 5y) + 3x(-3y - 7z) + 5y(-3y - 7z) = 2x(3x + 5y) + (-3y - 7z)(3x + 5y) = (3x + 5y)(2x + (-3y - 7z)) = (3x + 5y)(2x - 3y - 7z)$$

$$-22x^2 + 90xy - 10xz - 8y^2 + 40yz = -22x^2 + 2xy + 88xy - 10xz - 8y^2 + 40yz = -22x^2 + 88xy + 2xy - 8y^2 - 10xz + 40yz = x(-22x + 88y) + y(2x - 8y) + z(-10x + 40y) = 22x(-x + 4y) + 2y(x - 4y) + 10z(-x + 4y) = 22x(-x + 4y) - 2y(-x + 4y) + 10z(-x + 4y) = (-x + 4y)(22x - 2y + 10z)$$

$$(a + b)^2$$

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$$3) -40x^2 + 58xy + 24xz - 10y^2 - 30yz = -40x^2 + 50xy + 8xy + 24xz - 10y^2 - 30yz =$$

$$= x(-40x + 50y) + x(8y + 24z) + y(-10y - 30z) =$$

$$= 10x(-4x + 5y) + 8x(y + 3z) + 10y(-y - 3z) =$$

$$= 10x(-4x + 5y) + 8x(y + 3z) - 10y(y + 3z) =$$

$$= 10x(-4x + 5y) + (y + 3z)(8x - 10y) =$$

$$= 10x(-4x + 5y) + 2(y + 3z)(4x - 5y) =$$

$$= -10x(4x - 5y) + 2(y + 3z)(4x - 5y) =$$

$$= (4x - 5y)(-10x + 2(y + 3z)) =$$

$$= (4x - 5y)(-10x + 2y + 6z)$$

$$4) 6xy - 4xz - 24x - 12y^2 + 11yz + 48y - 2z^2 - 12z =$$

$$= 6xy - 4xz - 24x - 12y^2 + 3yz + 8yz + 48y - 2z^2 - 12z =$$

$$= 6xy - 4xz - 24x + 3yz - 2z^2 - 12z - 12y^2 + 8yz + 48y =$$

$$= x(6y - 4z - 24) + z(3y - 2z - 12) + y(-12y + 8z + 48) =$$

$$= 2x(3y - 2z - 12) + z(3y - 2z - 12) + 4y(-3y + 2z + 12) =$$

$$= 2x(3y - 2z - 12) + z(3y - 2z - 12) - 4y(3y - 2z - 12) =$$

$$= (3y - 2z - 12)(2x + z - 4y)$$

простые

$$5) 25x^2 - 70xy + 49y^2 = 25x^2 - 35xy - 35xy + 49y^2 =$$

$$= x(25x - 35y) + y(-35x + 49y) = 5x(5x - 7y) + 7y(-5x + 7y) =$$

$$= 5x(5x - 7y) - 7y(5x - 7y) = (5x - 7y)(5x - 7y) = (5x - 7y)^2$$

$$6) -42x^2 + 80xy - 32y^2 = -42x^2 + 56xy + 24xy - 32y^2 =$$

$$= x(-42x + 56y) + y(24x - 32y) = 7x(-6x + 8y) + 8y(3x - 4y) =$$

$$= 14x(-3x + 4y) + 8y(3x - 4y) = -14x(3x - 4y) + 8y(3x - 4y) =$$

$$= (3x - 4y)(-14x + 8y)$$

$$= 6xy - 4xz - 24x - 12y^2 + 3yz + 8yz + 48y - 2z^2 - 12z =$$
$$= 6xy - 12y^2 + 3yz - 4xz - 2z^2 - 12z - 24x + 8yz + 48y =$$
$$= y(6x - 12y + 3z) + z(-4x - 2z - 12) + 8(-3x + yz + 6y) =$$
$$= 3y(2x - 4y + z) + 2z(-2x - z - 6) + 8(-3x + yz + 6y)$$